

Name: Joyce Nakatumba-Nabende (PhD)

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Career Summary

Joyce is a lecturer in the Department of Computer Science and also heads the Makerere Artificial Intelligence Lab. She leads and has worked on several research projects at the lab that aim at developing and applying Artificial Intelligence and machine learning methods and tools to improve the quality of life especially in the developing world. Currently, she is carrying out research in several areas including application of computer vision, machine learning and natural language processing in the areas of health and agriculture. Through the Makerere Artificial Intelligence lab, she has been able to provide an environment to nurture and build institutional data science research training capacity for the masters, PhD, postdoc and training faculty trainees. She has supervised over 20 graduate students (completed and ongoing) including postdocs, PhD, and Masters from Computer Science, Software Engineering and Information systems.

Below is the summary of the Scientific research project that Joyce is leading.

Scientific Research Projects

Ongoing

- *Workstream Lead (2020-2022)*. End-to-end AI and data systems for targeted surveillance and management of COVID-19 and future pandemics affecting Uganda (COAST). Funded by IDRC, Canada.
- *Principal Investigator (2021-2022)* - Using Machine Learning for Prediction of Deforestation Google AI for Social Good Awards. Funded by Google.
- *Principal Investigator (2021-2022)* - Using Machine Learning for Localised and Targeted Agricultural Advisory to Smallholder Farmers in Uganda. Funded by Google.
- *Co-Principal Investigator (2020-2021)* - Improving Point-of-Care Learning for Prostate and Breast Cancer Imaging using Machine Learning Funded by Makerere University Research and Innovations Fund.
- *Principal Investigator (2019-2022)* - Sub-award Contract between Cornell University and Makerere University to Support The Next Generation Cassava Breeding Phase 2. Funded by Bill and Melinda Gates Foundation.
- *Principal Investigator (2019-2022)* - Predicting sweet potato sensory attributes using image analysis Funded by Bill and Melinda Gates Foundation.
- *AI Workstream Lead (2021-2026)* - Adaptive Environmental Monitoring Networks for East Africa Funded by Norhed II.
- *Principal Investigator (2021)* - Text Mining of Social Media Luganda Data to Track Misinformation and Perceptions Related to COVID-19 Transmission Mitigation Strategies Agency. Funded by Data Science Africa Research Grant.
- *Principal Investigator (2020-2022)* - Development of Machine Learning Datasets for Crop Pest and Disease Diagnosis based on Crop Imagery and Spectrometry Data Funded by Rockefeller Foundation.

Completed

- *Principal Investigator (2019-2021)* - Using Radio and Image Data for Crop Disease Surveillance. Funded by Bill and Melinda Gates Foundation.
- *Principal Investigator (2021)* - Evaluation of the use of telehealth for cervical cancer screening in Uganda-Results Follow up. Funded by Spider.
- *Co-Principal Investigator (2020-2021)* - Tracking and modelling trends in emergency services and treatment outcomes before and during the COVID-19 outbreak and nationwide lockdown. Funded by Makerere University Research and Innovations Fund.

- *Co-Principal Investigator (2020-20201)* - Improving Point-of-Care Learning for Prostate Cancer Imaging using Machine Learning Funded by Makerere University Research and Innovations Fund
- *Principal Investigator (2020-2021)* - Expert-in-the-loop Recommender System using Machine Learning for Localised Agricultural Advisory to Smallholder Farmers in a Developing Country Funded by Facebook.
- *Principal Investigator (2020-2021)* - Support for building the Luganda Common Voice community by Mozilla Foundation

Professional Experience

Position

- 2019-2020: Key constituent on the UN High-level Panel for Digital Innovations - Recommendation 3C - Artificial Intelligence
- 2020 – to date: Technical Advisory Panel Lacuna Fund - Our voice on Data by The Rockefeller Foundation, Google AI, IDRC and GIZ.
- 2020 – to date: Founding Member Open for Good Alliance – Inclusive AI Commons with Localized Data by FAIR Forward and Mozilla.
- 2020 – to date: Partner Responsible AI in Africa Network by Institute for Ethics in AI, Germany and Ghana Kwame Nkrumah University of Science and Technology.
- 2020 – to date: Member of Feminist AI Network and Expert Group organized by IDRC, Gender at Work, A+ Alliance and Women at the Table.
- 2020: General Chair Data Science Africa
- 2014 – to date: Lecturer, Department of Computer Science, College of Computing and Information Sciences.
- 2018 – to date: Head, Makerere Artificial Intelligence Lab, Makerere University.

Education

1. Eindhoven University of Technology, Eindhoven, The Netherlands - PhD in Computer Science (11/2013)
2. Makerere University, Kampala, Uganda - MSc Computer Science (05/2006)
3. Mbarara University of Science and Technology, Mbarara, Uganda - Bachelor of Computer Science (05/2014)

Publications

2021

- Adelani D. I., Abbott J., Neubig G., D'souza D., Kreutzer J., Lignos C., Palen-Michel C., Buzaaba H., Rijhwani S., Ruder S., Mayhew, S., Abebe Azime I., Muhammad S., Emezue C.C, **Nakatumba-Nabende J.**, Ogayo P., Aremu A., Gitau C., Mbaye D., Alabi J., Yimam S. M., Gwadabe T., Ezeani I., Niyongabo R. A., Mukiibi J., Otiende V., Orife I., David D., Ngom S., Adewumi T., Rayson P., Adeyemi M., Muriuki G., Anebi E., Chukwunkeke C., Odu N., Wairagala E. P., Oyerinde S., Siro C., Bateesa T. S., Oloyede T., Wambui Y., Akinode V., Nabagereka D., Katusiime A., Awokoya A., MBOUP M., Gebreyohannes D., Tilaye H., Nwaike K., Wolde D., Faye A., Sibanda B., Ahia O., Dossou B. F. P., Ogueji K., Ibrahima DIOP T., Diallo A., Akinfaderin A., Marengereke T., Osei S., [MasakhaNER: Named Entity Recognition for African Languages](#). Transactions of the Association for Computational Linguistics Vol 9: 1116–1131. DOI available: https://doi.org/10.1162/tacl_a_00416
- M. Kuhrmann, P. Tell, R. Hebig, J. Klünder, J. Münch, O. Linssen, D. Pfahl, M. Felderer, C. R. Prause, S. G. MacDonell, **J. Nakatumba-Nabende**, D. Raffo, S. Beecham, E. Tu'zu'n, G. López, N. Paez, D. Fontdevila, S. A. Licorish, S. Ku'pper, G. Ruhe, E. Knauss, Ö'zdenÖzcan-Top, P. Clarke, F. McCaffery, M. Genero, A. Vizcaino, M. Piattini, M. Kalinowski, T. Conte, R. Prikladnicki, S. Krusche, A. Coskuncay, E.

Scott, F. Calefato, S. Pimonova, R. Pfeiffer, U. P. Schultz, R. Heldal, M. Fazal-Baqaie, C. Anslow, M. Nayebi, K. Schneider, S. Sauer, D. Winkler, S. Biffi, M. Cecilia Bastarrica. [What Makes Agile Software Development Agile?](#) Accepted for publication in Transactions of Software Engineering Journal (2021)

- Nabende P., Senfuma S., **Nakatumba-Nabende J.** (2021) [An Evaluation of Bayesian Network Models for Predicting Credit Risk on Ugandan Credit Contracts](#). In: Arabnia H.R., Ferens K., de la Fuente D., Kozerenko E.B., Olivas Varela J.A., Tinetti F.G. (eds) Advances in Artificial Intelligence and Applied Cognitive Computing. Transactions on Computational Science and Computational Intelligence. Springer, Cham. https://doi.org/10.1007/978-3-030-70296-0_35
- **J. Nakatumba-Nabende.** [Leveraging AI](#). *Feminist AI* (2021)
- Kabiito D., **Nakatumba-Nabende J.** (2021) [Targeted Aspect-Based Sentiment Analysis for Ugandan Telecom Reviews from Twitter](#). In: Arabnia H.R., Ferens K., de la Fuente D., Kozerenko E.B., Olivas Varela J.A., Tinetti F.G. (eds) Advances in Artificial Intelligence and Applied Cognitive Computing. Transactions on Computational Science and Computational Intelligence. Springer, Cham. https://doi.org/10.1007/978-3-030-70296-0_24
- Opio, R.; Mugume, I.; **Nakatumba-Nabende, J.** [Understanding the Trend of NO2, SO2 and CO over East Africa from 2005 to 2020](#). *Atmosphere* 12, 1283. <https://doi.org/10.3390/atmos12101283> (2021)
- L. Muyama, **J. Nakatumba-Nabende**, D. Mudali. Automated Detection of Tuberculosis from Sputum Smear Microscopic Images using Transfer Learning Techniques (2019) 19th International Conference on Intelligent Systems Design and Applications (ISDA), In: Abraham, et. al., Advances in Intelligent Systems and Computing, Springer.
- J. Tusubira, S. Nsumba, F. Ninsiima, B. Akera, G. Acellam, **J. Nakatumba-Nabende**, E. Mwebaze, J. A Quinn, T. Oyana (2020) Improving In-field Cassava Whitefly Pest Surveillance with Machine Learning. In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (pp. 68-69).
- Nabende, P., Kabiito, D., Babirye, C., Tusiime., H. and **Nakatumba-Nabende, J.** (2021). Misinformation detection in Luganda-English code-mixed social media text. AfricaNLP 2021 Workshop @ EACL 2021 Conference.
- D. Kabiito and **J. Nakatumba-Nabende.** (2020) Targeted Aspect-Based Sentiment Analysis for Ugandan Telecom Reviews from Twitter. To appear in Advances in Artificial Intelligence and Applied Cognitive Computing (Transactions in Computational Science and Computational Intelligence book series), Series No. 11769, Springer.
- J. Klünder, R. Hebig, P. Tell, M. Kuhrmann, **J. Nakatumba-Nabende**, R. Heldal, S. Krusche, M. Fazal-Baqaie, M. Felderer, M. Bocco, S. Küpper, S. A. Licorish, G. López, F. Mc Caffery, Ö. Ö. Top, C. Prause, R. Prikladnicki, E. Tüzün, D. Pfahl, K. Schneider, S. MacDonell (2019) *Catching up with Method and Process Practice: An Industry-Informed Baseline for Researchers* In *Proceedings of the 41st International Conference on Software Engineering: Software Engineering in Practice*, pp. 255-264. IEEE Press.
- M. Kuhrmann, **J. Nakatumba-Nabende**, R. Schneiderl, P. Tell, J. Klünder, T. Conte, S. G. MacDonell, R. Hebig (2019) Walking through the Method Zoo: Does Higher Education really meet Software Industry Demands? In *Proceedings of the 41st International Conference on Software Engineering: Software Engineering Education and Training* (pp. 1-11). IEEE Press.
- **J. Nakatumba-Nabende**, B. Kanagwa, R. Hebig, R. Heldal, E. Knauss (2018) *Hybrid Software and Systems Development in Practice: Perspectives from Sweden and Uganda*. In: Felderer M., Méndez Fernández D., Turhan B., Kalinowski M., Sarro F., Winkler D. (eds). Product-Focused Software Process Improvement. Lecture Notes in Computer Science 10611, Springer 2017, pp. 431-419. Print ISBN 978-3-319-69925-7.
- **J. Nakatumba** and M. Westergaard and W.M.P. van der Aalst (2012). An Infrastructure for Cost-Effective Testing of Operational Support Algorithms Based on Colored Petri

Nets. Proceedings of the 33rd International Conference on Applications and Theory of Petri Nets. Springer Vol. 7347 pp. 308-327.

- **J. Nakatumba** and M. Westergaard and W.M.P. van der Aalst (2012). Generating Event Logs with Workload-Dependent Speeds from Simulation Models. Proceedings of the 8th Workshop on Enterprise and Organizational Modeling and Simulation, eds. M. Bajec and J. Eder. Springer Vol. 112 pp. 383-397.
- W.M.P. van der Aalst and **J. Nakatumba** and A. Rozinat and N. Russell (2010). Business Process Simulation. Handbook on Business Process Management eds. J. vom Brocke and M. Rosemann. Springer pp. 313-338.

Presentations

- Invited Talk at The 17th Embedded Vision Workshop at CVPR 2021: Building and Deploying End-to-End AI and Data Systems in a Developing World June 25th 2021
- Invited Speaker at the African Chatbot & Conversational AI conference 2021
- Organised and gave a lecture at the Machine Learning for Earth Observation Training of Trainers Boot Camp in Africa - May 3-14 2021: Done jointly with Radiant Earth Foundation, GIZ and Fair Forward.
- Invited Speaker at the Zindi AFD Women's Hackathon on the panel on Forging your journey in data science and AI - April 10th 2021
- Invited Speaker on a panel at the Open for Good Launch - December 16th 2020
- Invited Speaker at IGF 2020 WS #122 & Data to Inclusion: Building datasets in African Languages Nov 10, 2020
- Invited Speaker on a virtual panel hosted by IDRC and Sida that served as a 'soft launch' for the co-funded Artificial Intelligence for Development Programme (AI4D) - December 7th 2020
- Invited Speaker at RAIN Africa Workshop: Responsible AI and Agriculture 22nd July 2020
- Invited Speaker at AI4D Webinar on Lacuna Fund - 31st July 2020
- Data Science Africa Lecture: Introduction to Process Mining: Data Science in Action - July 2020
- Invited Speaker at ICLR 2020 Workshop on Computer Vision for Agriculture (CV4A) in Ethiopia: Mapping Geographical Diversity of Crop Disease Surveillance in a Crowdsourced Environment - 26th April 2020
- Keynote Speaker at 2019 IEEE/ACM Symposium on Software Engineering in Africa (SEiA) in Montreal, Canada: Artificial Intelligence & Data Science Research in Africa including case studies of AI for Agriculture and Healthcare - May 2019
- Invited Speaker at Workshop on ICT in Agriculture in Nairobi, Kenya: Artificial Intelligence for Development: Applications in Agriculture -September 2019